Aggregate shock and monetary policy regimes

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ABSTRACT

We study monetary policy transparency with regard to publication of central bank forecasts of the future state of the economy in the New Keynesian framework. The central bank has private information about the future aggregate shock. We compare two possible monetary policy regimes, transparent and opaque. The ex-ante welfare level is higher under the opaque regime, in which the central bank does not release its forecast. This is due to smoother consumption over the business cycle. We demonstrate that the welfare difference between the two regimes increases with the degree of monopoly power in the intermediate sector. In particular, the welfare difference vanishes when the intermediate sector is perfectly competitive. We also show that the welfare difference increases with the accuracy of information possessed by the central bank, and the welfare difference disappears when the central bank has no information advantage over the private sector about the economy. And, finally, we establish that the welfare difference increases with the level of shock fluctuations.

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1. Introduction

Just some fifteen years ago secrecy surrounding central banks was pervasive. However, some central banks, including those that have adopted inflation targeting, have recently taken steps towards more transparent policies. Some of them started releasing their forecasts on the future state of the economy. Such forecasts typically include projections of future inflation rate and growth rate of GDP.

While the literature on central bank transparency is growing, there is no consensus about its welfare implications. The standard approach uses a steady state linear-quadratic approximation of the economy. The central bank is assumed to maximize an ad hoc welfare function, which is usually a quadratic function in inflation and employment. Woodford (2003) demonstrates that for a class of economies this linear-quadratic welfare function is a good approximation of the actual welfare function around the steady state. A recent work by Kim and Kim (2003) pointed out an important qualification to this approximation. In addition to this concern, one always wonders how substantial monetary policy regime changes alter this approximation. And finally, the linear-quadratic approach is inapplicable if one wants to study an environment with heterogeneous agents.

The purpose of this study is to addresses the issue of transparency of monetary policy based on an explicit dynamic general equilibrium modeling approach. This allows us to address the welfare issue of transparency in a more precise way. To this end, we develop a stochastic dynamic general equilibrium model, which is a variant of the New Keynesian model similar to Ireland (1996). The model consists of a representative household, a final good firm, a continuum of monopolistically competitive intermediate good firms, financial intermediary, and a central bank who chooses monetary policy action to

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maximize welfare of the representative household. It is assumed that the central bank has private information about the future aggregate shock. The aspect of transparency we are interested in has to do with release of central bank projections of the future state of the economy.

We consider two monetary policy regimes, transparent and opaque, and make welfare comparison between the two. In the transparent regime, the central bank announces its forecast of the aggregate shock. We assume that the forecast is truthful, i.e. there is no strategic attempt to manipulate the public's beliefs. In the opaque regime, the central bank does not release its forecast. We first establish that the Friedman rule of zero interest rate holds in both regimes even though the central bank pursues an activist monetary policy. We next establish that output is less volatile in the opaque regime. This smoothes consumption across different states and increases welfare beyond the one under the transparent regime. Intuitively, forecasts amplify the effect of aggregate shocks by letting price-setters to choose their prices with better information. Alternatively, the lack of forecasts partially absorbs aggregate shocks by having price-setters avoid too much fluctuation in their prices. We demonstrate that the welfare difference between the two regimes increase with the degree of monopoly power of the intermediate sector. In particular, the welfare difference vanishes when the intermediate sector is perfectly competitive. We also show that the welfare difference increases with the accuracy of information possessed by the central bank. In particular, the welfare difference disappears when the central bank has no information advantage over the private sector about the economy, i.e. when the signal the central bank privately observes is uninformative. And, finally, we establish that the welfare difference increases with the level of shock fluctuations.

To build an intuition for our results, consider the limiting case when the central bank receives a perfect signal about the shock. In the transparent regime, it releases its forecast of the shock. The intermediate firms set their prices taking into account this information. They do so as if they had perfectly observed the shock. In this case we show that the rule of constant money growth is an optimal policy. Consumption is proportional to aggregate shocks. In contrast, when the regime is opaque, intermediate goods firms have to set prices to maximize expected profits. After the prices are set, the central bank knowing the shock chooses money growth rate. The optimal monetary policy actively responds to technology shocks and thus does not follow the constant money growth rate rule. As a result, consumption would be less responsive to shocks, i.e. it would be smoother than in the transparent regime. This makes the welfare level under the opaque regime higher than that under the transparent regime. When the central bank's information on the shock is not perfect, it does not follow the constant money growth rate in either regime. However, the effect of smoothed consumption in the opaque regime remains, and this delivers our main result.

An important aspect of transparency is whether the central bank releases its forecasts of inflation and other macroeconomic variables. For example, the Bank of Canada publishes point estimates of inflation rate and growth rate of GDP. The Bank of England and Swedish Riksbank publish inflation and GDP fan charts, which are probabilistic distributions over possible future values of inflation and GDP. Recently, the Federal Reserve in the US in a dramatic step towards transparency decided to publish its forecasts of GDP growth, unemployment rate and inflation four times a year; they will look three years into the future and will include the range of views of the members of the Federal Open Market Committee. Our model attempts to capture this feature of transparency of modern central banks by having the monetary authority release a one-period-ahead probabilistic forecast of the aggregate shock. This allows the private sector to reassess its perception of the state of the economy and make its decisions accordingly. We assume that the central bank has superior information about the economy. This is justified by the study of Romer and Romer (2000). They empirically compare the performance of the Federal Reserve and private forecasters and conclude that the Fed knows something about the future state of the economy that the market participants do not.

Our work is built on a large literature. A comprehensive review can be found in Geraats (2002). An important paper by Cukierman and Meltzer (1986) develops a model in which a central bank's preferences change stochastically over time and are private information. They show that when the policymaker is free to choose the accuracy of monetary control, she does not choose the most effective available control. Faust and Svensson (2001) extend this model and argue that increased transparency is socially beneficial, but complete transparency leads to the worst of all outcomes. Mishkin (2004) points out that central banks have benefitted from increased transparency: they have increased their credibility and anchored inflation expectations. He casts doubt on benefits of transparency in achieving central banks' long-run objectives.

Our paper, to the best of our knowledge, is the first in the literature on central bank transparency that uses an explicit dynamic stochastic general equilibrium approach. We introduce asymmetric information with regard to economic shocks, and we find that disclosure of the central bank's forecast has a welfare reducing effect. According to Geraats (2002), the type of information disclosure we study is called economic transparency. Several papers on economic transparency related to our work are worth mentioning here. The closest to our work are Cukierman (2001) and Gersbach (2002) who find that both inflation and output are more volatile under transparency. Similarly, in their analysis of a New Keynesian model where the central bank has superior information about the cost-push shock, Eijffinger and Tesfaselassie (2007) show that when there is no uncertainty about the policymaker's preferences, transparency impairs stabilization of current inflation and output. However, when there is preference uncertainty, disclosure is harmless. Our finding that transparency reduces welfare has a very similar intuition.

Jensen (2002) points to the trade-off between credibility and flexibility in the choice of optimal degree of transparency; and our work confirms the importance of flexibility. Geraats (2005) analyzes the welfare effect of publication of the central bank forecasts and concludes that transparency improves welfare. Her use of asymmetry with regard to economic shocks is similar to ours. However, her model has also uncertainty with regard to the central bank's preferences. Demertzis and